off the extreme northern coast of Newfoundland icebergs were observed on ten dates.

Compared with ice reported for October during the five preceding years a deficiency is shown for October, 1888. The southernmost ice was about six and one-half degrees north of the average southern limit, and the easternmost ice was about seven and one-half degrees west of the average eastern limit.

FOG.

The limits of fog-belts to the westward of the fortieth meridian are shown on chart i by dotted shading. In the vicinity of the Banks of Newfoundland fog was reported on eleven days as compared with sixteen days for September, 1888, and fourteen days for October, 1887. Between the fifty-fifth and sixty-fifth meridians fog was reported for a total of two days as compared with eleven days for September, 1888, and two days for October, 1887. To the westward of the sixty-fifth meridian fog was reported on five days as compared with eleven days for September, 1888, and four days for October, 1887.

As compared with September, 1888, the southern limit of the Newfoundland fog-belt has extended about one degree, while in the vicinity of the American coast fog was reported about three degrees further south than in the preceding month.

In the several instances in which fog was reported over or near the Banks of Newfoundland the presence or passage of a centre of low barometric pressure was noted to the northward or westward. On the two dates for which fog was encountered south of Nova Scotia a storm-centre was passing eastward over Nova Scotia. The development of fog off the coast of the United States was generally attended by relatively high barometric pressure and variable winds, following the passage of areas of low pressure to the northward.

The following are limits of fog-areas on the north Atlantic Ocean during October, 1888, as reported by shipmasters:

Date.	Entered.		Cleared.		Date.	Entered.		Cleared.	
	Lat. N.	Lon. W.	Lat. N.	Lon. W.		Lat. N.	Lon. W.	Lat. N.	Lon. W.
	° ′	° ′	° ′	° ′		° ′	° ′	° ′	° ′
1	47 00	46 00	46 00	49 00	18	45 00	59 30	45 25	58 01
3-4	48 00	45 00	46 00	51 00	19	46 18	47 47	46 02	48 40
4	54 17	44 48	54 10	45 20	20	46 53	47 59	46 47	48 12
8	At St. Johns, N.F.				21	45 17	49 07	46 08	46 17
8	43 00	61 40	42 30	63 04	23-24	New York.		39 50	73 40
8	41 02	66 48	41 08	67 05	24	36 30	74 40	36 50	74 37
8	46 44	47 05	45 51	50 09	27-28	35 20	75 15	37 57	75 00
9-10	44 00	51 20	46 16	44 32	28	40 30	72 00	Off Sandy Hook.	
9-10	48 22	48 42	47 26	52 28	28-29	Boston.		40 30	69 00
9-10	42 42	47 50	42 50	51 00	.....	.....	.....	.....	.....
10	42 36	50 05	43 10	48 00	.....	.....	.....	.....	.....
10-11	45 03	51 33	45 52	45 52	.....	.....	.....	.....	.....
12	49 24	43 10	49 09	44 27	.....	.....	.....	.....	.....

TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for October, 1888, is exhibited on chart ii by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperatures and the departures from the normal are given for stations of the Signal Service. The figures opposite the names of the geographical districts in the columns for mean temperature show the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. Chart iii exhibits normal and current October temperature curves for selected stations.

The mean temperature was highest over southern Florida, where a reading of 79°.1 was reported at Key West. Values rising above 70° were also reported along the west coast of the Gulf of Mexico and in the lower Colorado valley. In the Sacramento and San Joaquin valleys the readings rose above 65°. The lowest mean temperatures occurred in northern Ontario, Canada, where they fell to 38°.4 at Rockliffe, and over the lower Saint Lawrence valley, Lake Superior, northern Minnesota, Dakota, and Manitoba, where they ranged below 40°.

The mean temperature corresponded with the normal over portions of New Brunswick, Nova Scotia, southeastern Texas, and New Mexico, and along a line traced from the northern boundary of Dakota and Montana southward and southeastward to the Gulf of Mexico between Galveston, Tex., and New Orleans, La. Over a greater part of the country east of the one-hundredth meridian the mean temperature was below the normal, the deficiencies being most marked from New Hampshire southwestward to eastern Tennessee, and along the Atlantic coast between the thirty-eighth and fortieth parallels, where they exceeded 6°. To the westward of the one-hundredth meridian the temperature was generally above the normal, the greatest excesses occurring in the middle Sacramento valley and over western Montana, where they exceeded 4°.

The following are some of the most marked departures from the normal at the older established Signal Service stations:

Above normal.	°	Below normal.	°
Sacramento, Cal	4.2	Rochester, N. Y.	6.8
Helena, Mont	4.2	Atlantic City, N. J	6.8
Fort Assinaboine, Mont	4.0	Albany, N. Y.	6.4
Olympia, Wash.	3.8	Columbus, Ohio	6.3
San Diego, Cal	3.8	Knoxville, Tenn	6.3

DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for October, 1888; (4) the departure of the current month from the normal; (5) and the extreme monthly means for October during the period of observation and the years of occurrence:

State and Station.	County.	(1) Normal for the month of Oct.	(2) Length of record.	(3) Mean for Oct., 1888.	(4) Departure from normal.	(5) Extreme monthly mean temperature for October.			
						Highest.		Lowest.	
						Am't.	Year.	Am't.	Year.
Arkansas.		°	*Years*	°	°	°		°	
Lead Hill	Boone	60.7	7	56.9	−3.8	65.6	1881	56.0	1885
California.									
Sacramento	Sacramento	60.4	22	57.6	−2.8	67.2	1875	54.7	1873
Connecticut									
Southington	Hartford	51.0	19	45.3	−5.7	56.1	1879	45.3	1888
Florida.									
Merritt's Island	Brevard	74.9	5	75.5	+0.6	76.2	1884	73.1	1885
Illinois.									
Aurora	Kane	51.0	10	47.4	−3.6	.....	.....	.....	.....
Golconda	Pope	60.8	11	55.6	−5.2	.....	.....	.....	.....
Greenville	Bond	57.7	10	51.5	−6.2	.....	.....	.....	.....
Peoria	Peoria	54.0	33	51.3	−2.7	62.7	1879	45.0	1869
Riley	McHenry	47.3	28	45.4	−1.9	.....	.....	.....	.....
Sandwich	De Kalb	51.5	38	51.0	−0.5	.....	.....	.....	.....
Indiana.									
Blue Lick	Clark	58.0	11	51.2	−6.8	.....	.....	.....	.....
Spiceland	Henry	51.2	34	48.7	−2.5	.....	.....	.....	.....
Vevay	Switzerland	56.2	22	51.7	−4.5	65.0	1879	46.5	1869
Iowa.									
Cresco	Howard	46.2	16	44.1	−2.1	.....	.....	.....	.....
Independence	Buchanan	48.0	13	46.0	−2.0	56.0	1879	45.0	1876
Monticello	Jones	49.5	35	46.2	−3.3	58.0	1879	36.0	1873
Kansas.									
Independence	Montgomery	58.2	17	56.5	−1.7	63.0	1881	52.2	1872
Lawrence	Douglas	54.4	21	53.0	−1.4	60.5	1879	44.0	1869
Yates Centre	Woodson	54.8	8	53.4	−1.4	58.8	1884	50.4	1885
Louisiana.									
Point Pleasant	Tensas	65.2	8	63.6	−1.6	.....	.....	.....	.....
Maine.									
Gardiner	Kennebec	47.2	52	42.9	−4.3	52.5	1879	42.8	1859
Maryland.									
Cumberland	Allegany	53.3	17	48.0	−5.3	60.0	1881	48.0	1888
Massachusetts.									
Somerset	Bristol	53.3	18	48.8	−4.5	.....	.....	.....	.....
Taunton	....do	53.1	17	46.8	−6.3	.....	.....	.....	.....
Michigan.									
Adrian	Lenawee	50.1	11	45.6	−4.5	.....	.....	.....	.....
Kalamazoo	Kalamazoo	50.6	13	47.4	−3.2	.....	.....	.....	.....
Thornville	Lapeer	51.4	12	45.9	−5.5	.....	.....	.....	.....
New Jersey.									
South Orange	Essex	53.2	19	47.6	−5.6	.....	.....	47.6	1888

Deviations from normal temperatures—Continued.

State and Station.	County.	(1) Normal for the month of Oct.	(2) Length of record.	(3) Mean for Oct., 1888.	(4) Departure from normal.	(5) Extreme monthly mean temperature for October.			
						Highest.		Lowest.	
						Am't.	Year.	Am't.	Year.
New Jersey.									
Moorestown	Burlington	53.5	25	48.6	−4.9	59.5	1879	48.7	1869
New York.									
Palermo	Oswego	46.9	35	43.9	−3.0	53.9	1879	39.3	1873
Ohio.									
Wauseon	Fulton	51.0	18	46.0	−5.0	59.0	1879	46.0	1875'88
Oregon.									
Albany	Linn	51.1	10	54.9	+3.8	56.3	1885	46.0	1881
Pennsylvania.									
Dyberry	Wayne	44.3	21	41.3	−3.0	53.9	1879	41.3	1888
Grampian Hills	Clearfield	48.0	25	43.4	−4.6	56.4	1879	39.2	1869
Wellsborough	Tioga	53.1	15	46.6	−6.5	67.2	1875	44.3	1877
South Carolina.									
Statesburgh	Sumter	64.0	8	59.8	−4.2	69.0	1881	59.8	1885'88
Tennessee.									
Milan	Gibson	58.2	6	56.1	−2.1	76.0	1884	45.0	1885
Texas.									
New Ulm	Austin	69.8	17	69.9	+0.1	73.9	1881	65.8	1873
Vermont.									
Strafford	Orange	47.3	14	40.6	−6.7	52.8	1879	40.6	1888
Virginia.									
Bird's Nest	Northampt'n	61.9	19	55.4	−6.5	69.2	1881	53.9	1886
Wytheville	Wythe	53.3	24	46.3	−7.0	59.0	1879	46.3	1888
West Virginia.									
Helvetia	Randolph	51.7	12	45.4	−6.3	56.8	1881	45.4	1888

The highest temperatures for the month were reported in southern Arizona, where a reading of 105°.1 was registered at Yuma. Values above 90° were recorded in the Sacramento and San Joaquin valleys, and in central and southeastern Texas. At Los Angeles, Cal., a maximum of 98° was attained. Excessive maximum temperatures were reported at two stations only, Olympia and Spokane Falls, Wash., where the readings were higher than for any preceding October during the last twelve and eight years, respectively, by 1° at the former and 4°.5 at the latter station. At stations in New England, on Lake Superior, and in the upper Missouri valley the highest temperatures for the month fell below the maximum values of the corresponding month of previous years by more than 20°.

The lowest temperatures occurred in the upper Missouri valley, where they fell to 16°.2 at Fort Assinaboine, Mont.; they were generally below 20° in Dakota, eastern Montana, and along the northern slope of the Rocky Mountains, while over the middle plateau region they fell below 25°. Unusually low temperatures were not reported, and over a greater part of the country, notably in the central valleys and along the eastern slope of the Rocky Mountains, the lowest temperatures were from 10° to 25° above the lowest readings of the corresponding month of previous years.

Table of comparative maximum and minimum temperatures for October.

State or Territory.	Stations.	For 1888.		Since establishment of station.				Length of record.
		Max.	Min.	Max.	Year.	Min.	Year.	
		°	°	°		°		*Yrs.*
Alabama	Mobile	86.0	48.0	93.4	1884	34.0	1873, 1887	18
Do	Montgomery	84.3	43.0	96.1	1884	32.0	1887	17
Arizona	Whipple B'ks	84.5	29.0	86.0	1881	18.0	1880	13
Do	Fort Apache	86.7	30.2	88.0	1887	19.0	1880	10
Arkansas	Fort Smith	84.5	34.0	94.6	1884	31.0	1886	7
Do	Little Rock	82.5	37.0	90.0	1881, 83, 84	33.1	1886, 1887	10
California	San Francisco	86.8	49.5	87.0	1887	45.0	1881	18
Do	San Diego	80.0	53.0	92.0	1879	44.0	1878	17
Colorado	Denver	79.8	26.0	86.0	1873	1.0	1873	17
Do	Montrose	78.0	25.3	83.0	1887	19.0	1885	4
Connecticut	New Haven	66.2	29.6	86.0	1881	24.0	1879	16
Do	New London	65.2	56.2	82.7	1879	27.2	1883	17
Dakota	Fort Buford	75.8	21.8	95.0	1879	0.3	1887	10
Do	Yankton	81.8	23.5	89.0	1879	9.0	1878	16
Dis. of Columbia	Washington City	75.0	35.2	92.3	1881	26.0	1873	18
Florida	Jacksonville	86.0	49.9	92.0	1883	40.0	1873, 1887	18
Do	Key West	85.4	65.6	92.0	1876	65.0	1873, 1876	18
Georgia	Atlanta	79.2	40.5	90.8	1884	30.1	1887	11
Do	Savannah	82.3	49.0	92.0	1884	37.0	1873	18
Idaho	Boisé City	82.0	24.8	87.4	1887	16.4	1887	12
Illinois	Cairo	82.1	36.5	88.0	1872, 1884	24.0	1873	17
Do	Chicago	76.3	31.5	84.0	1879	14.2	1887	17
Indiana	Indianapolis	78.4	32.0	87.0	1884	22.3	1887	16
Indian Ter	Fort Sill	87.5	33.0	91.0	1878, 1884	25.0	1878	11
Iowa	Dubuque	77.3	28.3	86.0	1879	14.6	1887	16
Do	Des Moines	79.0	27.8	85.8	1884	13.8	1887	11
Kansas	Dodge City	84.8	30.4	92.4	1887	10.0	1878	15
Do	Leavenworth	85.8	32.1	89.3	1887	19.0	1873	18

Table of comparative maximum and minimum temperatures, &c.—Cont'd.

State or Territory.	Stations.	For 1888.		Since establishment of station.				Length of record.
		Max.	Min.	Max.	Year.	Min.	Year.	
		°	°	°		°		*Yrs.*
Kentucky	Louisville	77.4	32.5	90.0	1884	25.5	1887	17
Louisiana	New Orleans	87.0	54.7	90.0	1884	40.0	1873	18
Do	Shreveport	87.4	43.5	95.0	1883	31.0	1873	16
Maine	Eastport	62.3	31.0	80.0	1879	24.0	1881	16
Do	Portland	61.0	28.8	83.0	1881	27.6	1886	17
Maryland	Baltimore	73.8	36.0	89.0	1879, 1881	30.0	1873, 76, 79	17
Massachusetts	Boston	69.0	33.8	90.0	1881	25.0	1879	18
Michigan	Marquette	65.9	29.1	87.0	1879	12.5	1887	15
Do	Grand Haven	64.0	29.5	80.0	1879	20.2	1887	16
Minnesota	Saint Vincent	76.0	19.0	81.6	1886	−10.3	1887	9
Do	Saint Paul	75.4	27.7	87.0	1879	11.5	1887	17
Mississippi	Vicksburg	85.3	44.0	93.7	1884	33.5	1887	17
Missouri	Saint Louis	85.2	36.0	90.0	1879	24.0	1887	18
Montana	Ft. Assinaboine	79.0	16.2	83.0	1884, 1885	−16.0	1881	9
Do	Helena	75.0	21.0	76.9	1885	2.7	1887	9
Nebraska	North Platte	80.0	19.8	89.0	1879	9.1	1887	15
Do	Omaha	80.2	28.2	87.0	1879	15.0	1878	16
Nevada	Winnemucca	79.5	20.8	87.0	1887	10.0	1878	10
New Jersey	Atlantic City	71.0	30.0	83.0	1884	29.0	1879	15
New Mexico	Santa Fé	72.3	29.5	85.0	1878	16.0	1880	15
New York	Buffalo	66.2	30.8	83.0	1879	24.4	1887	16
Do	New York City	68.7	34.9	88.3	1881	31.0	1876	18
North Carolina	Charlotte	78.0	37.0	91.9	1884	30.0	1879	10
Do	Wilmington	79.2	44.7	92.5	1884	32.0	1876	18
Ohio	Cincinnati	79.2	33.9	87.7	1884	26.1	1887	18
Do	Sandusky	76.0	32.7	87.0	1879	24.0	1887	12
Oregon	Portland	81.5	37.0	82.2	1885	31.0	1877	16
Do	Roseburg	82.8	32.6	90.9	1885	22.5	1881	12
Pennsylvania	Pittsburgh	73.8	32.7	91.1	1884	20.0	1887	16
Do	Philadelphia	69.5	34.8	87.0	1879, 1881	30.6	1887	18
Rhode Island	Block Island	62.3	34.1	75.4	1881	32.6	1884	9
South Carolina	Charleston	81.1	50.2	93.0	1883	39.0	1873	16
Tennessee	Knoxville	78.1	35.6	94.0	1884	25.0	1876	18
Do	Memphis	82.6	40.0	92.0	1879, 1884	29.0	1878	16
Texas	Brownsville	88.0	52.0	95.0	1877	49.0	1879	12
Do	Fort Elliott	87.7	34.2	89.3	1887	25.3	1887	9
Utah	Salt Lake City	78.2	31.5	85.2	1887	22.0	1878	15
Virginia	Lynchburgh	78.0	32.7	91.3	1884	28.0	1879	16
Do	Norfolk	75.8	40.8	89.0	1881, 1884	31.0	1876	18
Washington	Spokane Falls	81.5	23.0	77.0	1886	12.3	1887	8
Do	Olympia	74.0	35.0	73.0	1880	23.0	1881	12
Wisconsin	La Crosse	73.0	25.6	84.0	1884	6.2	1887	16
Do	Milwaukee	72.6	30.1	83.1	1884	14.8	1887	18
Wyoming	Cheyenne	72.0	16.5	81.6	1887	−4.0	1878	16

RANGES OF TEMPERATURE.

The monthly and the greatest and least daily ranges of temperature at Signal Service stations are given in the table of miscellaneous meteorological data. The greatest monthly ranges occurred in the Missouri Valley, where, in localities, they exceeded 60°. They were least over southern Florida, where they were less than 20°, and at stations on the south New England and North Carolina coasts, where they were less than 30°. Along the Pacific coast the ranges were less than 30°, except at Los Angeles and San Francisco, Cal., where they amounted to 54° and 37°.3, respectively.

The following are some of the extreme monthly ranges:

Greatest.		Least.	
	°		°
Fort Assinaboine, Mont	62.8	Key West, Fla	19.8
Huron, Dak	62.0	Jupiter, Fla	24.9
Fort Custer, Mont	61.5	Pysht, Wash	25.0
Concordia, Kans	60.2	San Diego, Cal	27.0
Spokane Falls, Wash	58.5	Hatteras, N. C	27.8
Los Angeles, Cal	54.0	Block Island, R. I	28.2

FROST.

Frost occurred south of the fortieth meridian as follows: 1st, Ala., Ga., Md., Nev., N. C., S. C., Tenn., Utah. 2d, Colo., Ill., Ind., Kans. 3d, Ala., Del., D. C., Ga., Ill., Ind., Kans., Ky., Md., Miss., Mo., Nev., N. J., N. C., Ohio, Pa., S. C., Tenn., Utah, Va., W. Va. 4th, Ala., Del., D. C., Ga., Ind., Ky., Md., Nev., N. J., N. Mex., N. C., Ohio, Pa., S. C., Tenn., Va., W. Va. 5th, Nev., N. Mex. 6th, Ill., Kans., Utah. 7th, Col., Ill., Kans., Mo., Nev. 8th, Ala., Colo., Ill., N. Mex., W. Va. 9th, Del., D. C., Ill., Ind., Md., Nev., N. J., N. Mex., Ohio, W. Va. 10th, Colo., Del., D. C., Ill., Ind., Ky., Md., Nev., N. J., N. C., Ohio, Va., W. Va. 11th, Ill., Kans., Nev., N. Mex. 12th, Ala., Ill., Kans., Mo., Nev., N. Mex., Tenn. 13th, Colo., Ill., Kans., Mo., Nev., Tenn. 14th, Ala., Colo., Ill., Mo., Nev., S. C., Tenn., Utah. 15th, Ariz., Colo., Del., Kans., Md., Nev., N. J., N. C., S. C., Utah, Va. 16th, Colo., Ill., Mo., Nev., N. Mex., Utah. 17th, Ill., Ind., Kan., Mo. 18th, D.

C., Ill., Md., Nev., N. J., Va., W. Va. 19th, Cal., Colo., Kans., Nev., N. Mex., Utah. 20th, Cal., Ill., Ind., Kans., Ky., Mo., Nev., Ohio, Utah, W. Va. 21st, Ala., Ga., D. C., Ill., Ind., Kans., Ky., Mo., Nev., N. C., Ohio, S. C., Tenn., Utah, Va., W. Va. 22d, Ariz., Colo., Del., D. C., Ind., Kans., Md., Nev., N. J., N. C., Va. 23d, Ariz., Colo., D. C., Kans., Mo., Nev., N. Mex., N. C., Tex., Utah, Va., W. Va. 24th, Ariz., Colo., Ill., Ind., Kans., Nev., N. Mex., Tex., Utah. 25th, Ariz., Ill., Ind., Kans., Mo., N. J., N. Mex., Ohio, Tex., Utah. 26th, Ariz., Colo., Kans., N. Mex., Tex. 27th, Ariz., Col., Kans., Mo., Nev., Utah. 28th, Ariz., Colo., Ill., Ind., Kans., Mo., Nev., N. Mex., Ohio, Tex., Utah. 29th, Ala., Colo., Ill., Ind., Kans., Ky., Md., Miss., N. Mex., N. C., Ohio, S. C., Tenn., Va., W. Va. 30th, Del., D. C., Ill., Ind., Ky., Nev., N. J., N. M., N. C., Ohio, Pa., Va., W. Va. 31st, Del., D. C., Ill., Ky., Md., N. J., N. C., Ohio, Pa., Va., W. Va.

The following are reports of injury to vegetation by frosts during the month:

Ripley, Ohio, 2d: the late heavy frost has been very injurious to the tobacco crop in this section.

Dunkirk, Md.: a heavy frost occurred the night of the 3d–4th, causing damage to tobacco and other outstanding crops.

Boston, Mass., 9th: the frost, rain, and snow of last week caused considerable damage to crops in many places throughout New England.

To the southward of the fortieth parallel frost was most frequently noted in the central valleys; in the south Atlantic states it was reported as far south as the thirty-third parallel; on the central Gulf coast it occurred at New Orleans on five days, while in Texas it was noted as far south as San Antonio, where it occurred on the 24th and 25th. In Arizona frost was reported on seven days; in the middle Sacramento valley on the 19th and 20th, while in northeastern California and southern Oregon its occurrence was frequently noted.

COTTON REGION REPORTS.

The rainfall was about normal in the New Orleans and Vicksburg districts; in Galveston and Little Rock districts the rainfall was about 20 and 40 per cent., respectively, below the average. In all other districts the rainfall was in excess of the average, notably in Savannah and Montgomery districts, where it was more than double the usual amount for the month.

The means of the maximum temperatures were below the average in all districts, the greatest departures occurring in the Atlanta, Wilmington, Memphis, and Montgomery districts, where they exceeded 5°. The means of the minimum temperatures were below the average in all districts, except Galveston, where they were slightly above the average of six years.

In the following table the average rainfall and the means of the maximum and minimum temperatures in the cotton region are given, for October, 1888, together with normals and extreme temperatures obtained from similar observations of the last six years:

Temperature and rainfall data for the cotton districts, October.

District. (The reporting centre for each is named below.)	Rainfall.			Temperature.							
				Maximum.			Minimum.			Extremes at any station in the district for Oct., 1888.	
	Average for Oct. of six preceding years.	Average for Oct., 1888.	Departures.	Mean for Oct. of six preceding years.	Mean for Oct., 1888.	Departures.	Mean for Oct. of six preceding years.	Mean for Oct., 1888.	Departures.	Max.	Min.
	Inches	*Inches*	*Inches.*	°	°	°	°	°	°	°	°
New Orleans..	2.66	2.47	— 0.19	79.4	77.1	— 2.3	57.6	55.5	— 2.1	88	38
Savannah	2.45	5.35	+ 2.90	79.7	78.4	— 1.3	58.4	55.7	— 2.7	92	35
Charleston....	2.49	4.62	+ 2.13	76.7	74.5	— 2.2	54.2	53.3	— 0.9	88	37
Atlanta	2.35	3.88	+ 1.53	74.5	69.0	— 5.5	52.6	48.9	— 3.7	86	30
Wilmington*.	2.98	3.60	+ 0.62	75.1	69.5	— 5.6	52.8	48.2	— 4.6	83	29
Memphis	2.21	2.95	+ 0.74	74.7	69.4	— 5.3	50.9	48.1	— 2.8	83	29
Galveston*...	2.86	2.24	— 0.62	80.1	79.6	— 0.5	58.1	59.0	+ 0.9	92	35
Vicksburg	2.79	2.73	— 0.06	77.6	73.8	— 3.8	55.4	52.3	— 3.1	91	40
Montgomery .	1.66	4.47	+ 2.81	78.2	73.1	— 5.1	58.1	52.7	— 5.4	85	38
Augusta	2.53	4.64	+ 2.11	76.1	71.4	— 4.7	53.3	49.7	— 3.6	84	33
Little Rock...	1.72	0.95	— 0.74	75.9	71.7	— 4.2	50.3	50.3	0.0	89	32
Mobile.....	2.02	3.09	+ 1.07	78.7	75.2	— 3.5	54.2	52.5	— 1.7	89	37

*Normal for five years.

TEMPERATURE OF WATER.

The following table shows the maximum, minimum, and mean water temperature as observed at the harbors of the several stations; the monthly range of water temperature; and the mean temperature of the air for October, 1888:

Stations.	Temperature at bottom.				Mean temperature of air at the station.
	Max.	Min.	Range.	Monthly mean.	
	°	°	°	°	°
Canby, Fort, Wash.....	60.8	53.7	7.1	57.4	55.2
Cedar Keys, Fla	80.0	69.9	10.1	74.5	70.0
Charleston, S. C....	72.8	67.1	5.7	69.7	64.2
Eastport, Me	50.2	47.6	2.6	48.8	43.4
Galveston, Tex	79.0	68.0	11.0	74.6	72.2
Key West, Fla.....	84.0	75.3	8.7	80.1	79.1
New York City	62.9	50.7	12.2	55.7	49.2
Pensacola, Fla	77.0	69.8	7.2	73.8	67.2
Portland, Me	57.1	46.8	10.3	49.8	43.3
Portland, Oregon	65.0	53.0	12.0	60.2	55.5

PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for October, 1888, as determined from the reports of about one thousand stations, is exhibited on chart iv. In the table of miscellaneous meteorological data are given, for each Signal Service station, the total precipitation, with the departure from the normal. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

From the October chart it will be seen that the monthly rainfall was greatest on the north Pacific coast, where it reached twelve inches; more than eight inches fell in portions of the Canadian Maritime Provinces and northern New England, and from six to eight inches fell in portions of the south Atlantic states, and in southern Louisiana in the vicinity of New Orleans; in the Lake region, and, with the exception of the southern plateau and north Pacific coast, in all districts west of the Mississippi River, less than 75 per cent. of the normal amount of rain fell, that for the lower Missouri and Rio Grande valleys being less than half the normal; in Florida the rainfall averaged about 67 per cent. of the normal; in New England and the middle Atlantic states the rainfall exceeded the average by about 15 per cent., and in the south Atlantic and east Gulf states and on the north Pacific coast 30 per cent. Over a large part of California there was a total absence of rain, and so far as shown by the reports of the Signal Service and voluntary observers but little rain fell in any part of the state. A newspaper report from Campo, however, states that rain began falling there on the evening of the 17th, and continued about forty-eight hours, two and a half inches having fallen up to that time. The average rainfall in California for October, as determined from Signal Service observations, is slightly more than an inch for the northern part of the state, and somewhat less than half an inch for the southern part.

DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for a series of years; (2) the length of record during which the observations have been taken, and from which the average has been computed; (3) the total precipitation for October, 1888; (4) the departure of the current month from the average;